CLAIMS:

I claim:

1. A pet tag, the tag comprising:

a housing configured for attaching the tag to a pet;

an internal power supply contained within said housing; and

a spread spectrum transmitter contained within said housing;

wherein said spread spectrum transmitter has a transmit power substantially equal to or less than 1000μW.

2. A pet tag as claimed in claim 1 wherein said spread spectrum transmitter has a transmit power substantially equal to or less than 200μW.

3. A pet tag as claimed in claim 1 wherein said spread spectrum transmitter has a spreading code length equal to or greater than $2^4 - 1$ bits.

4. A pet tag as claimed in claim 1 wherein said spread spectrum transmitter is a direct sequence spread spectrum transmitter.

5. A pet tag as claimed in claim 1 wherein said spread spectrum transmitter is permanently connected to said internal power supply.

6. A pet tag as claimed in claim 1 wherein the supply of power from said internal power supply to said spread spectrum transmitter is controlled by a manually-operated switch.

7. A pet tag as claimed in claim 1 wherein the output of said spread spectrum transmitter is pulsed, the pulses having an on state when said transmitter is

transmitting a spread spectrum signal and an off state when said transmitter is not transmitting.

8. A tag for locating an object, the tag comprising:

an rf transmitter to transmit a coded signal; and

an acoustic command receiver to receive an acoustic command; and

wherein the coded signal is transmitted in response to reception of an acoustic command.

9. A tag as claimed in claim 8 wherein the coded signal is a spread spectrum signal having a spreading sequence code.

10. A tag as claimed in claim 9 wherein the rf transmitter is a direct sequence spread spectrum transmitter.

11. A tag as claimed in claim 10 wherein the spreading sequence comprises a Gold code.

12. A tag as claimed in claim 10 wherein the spreading sequence comprises a Kasami code.

13. A tag as claimed in claim 9 wherein the length of the spreading sequence is $\leq 2^{10} - 1$ chips, and preferably $\leq 2^{8} - 1$ chips.

14. A tag as claimed in claim 9 wherein the spread spectrum signal comprises the spreading sequence code modulated by baseband data.

15. A tag as claimed in claim 14 wherein a tag identity comprises a combination of the spreading sequence code and the baseband data.

16. A tag as claimed in claim 12 wherein the spreading sequence code is unmodulated by baseband data.

17. A tag as claimed in claim 16 wherein the length of the spreading sequence is $\leq 2^{12} - 1$ chips, and preferably $\leq 2^{10} - 1$ chips.

18. A tag as claimed in claim 8 wherein the command receiver is configured to control a power supply to at least part of the tag.

19. A tag as claimed in claim 18 wherein the command receiver controls a power supply to the transmitter for transmitting the coded signal and for ending the transmission after a time interval, or on cessation of the command, or on receipt of a stop command.

20. A tag as claimed in claim 8 wherein the command receiver is responsive to acoustic commands at a frequency of $\geq$ 5KHz, preferably $\geq$ 10KHz, more preferably $\geq$ 15KHz, still more preferably $\geq$ 17KHz, and most preferably $\geq$ 20KHz.

21. A tag as claimed in claim 8 wherein the command receiver is responsive to acoustic commands which are substantially inaudible to most adult humans.

22. A tag as claimed in claim 8 wherein the command receiver comprises an acoustic transducer coupled to a tone detector.

23. A tag for locating an object, the tag comprising:

a command receiver to receive a command; and

a spread spectrum rf transmitter, the spread spectrum transmitter having a spreading code;

wherein the transmitter transmits a spread spectrum signal responsive to a received command; and

wherein the transmitted signal conveys the spreading code unmodulated by baseband data.

24. A tag as claimed in claim 23 wherein identity data for the tag consists of the spread spectrum spreading code.

25. A tag as claimed in claim 23 wherein the tag transmits only the spreading code.

26. A tag as claimed in claim 23 wherein the spreading code comprises a Gold code.

27. A tag as claimed in claim 23 wherein the spreading code comprises a Kasami code.

28. A tag as claimed in claim 23 wherein the transmitter is a direct sequence spread spectrum transmitter.

29. A tag as claimed in claim 23 wherein the length of the spreading sequence is $\leq 2^{14} - 1$, and preferably $\leq 2^{12} - 1$.

30. A tag as claimed in claim 23 wherein the command receiver includes an acoustic transducer and is responsive to acoustic commands.

31. A tag as claimed in claim 30 wherein the command receiver is responsive to acoustic commands which are substantially inaudible to adult humans.

32. A tag as claimed in claim 23 wherein the command receiver controls a power supply to the transmitter to switch transmission on.

33. A tag as claimed in claim 32 further comprising means to switch transmission off after a predetermined interval.

34. A tag as claimed in claim 8 further comprising means to collect and store solar power.

35. A tag as claimed in claim 8 further comprising a battery for powering the tag, and a battery monitor for indicating when battery power is low.

36. A tag as claimed in claim 35 wherein the battery monitor comprises an indicator with an on-off duty cycle in which the on period is less than the off period.

37. A tag as claimed in claim 35 wherein the battery monitor is configured to periodically put the battery under load to test the battery.

38. A detector for locating an object having a tag, the detector comprising:

a direct sequence spread spectrum (DSSS) receiver for receiving from the tag a spread spectrum signal based on a Gold or Kasami code;

a first aerial coupled to the receiver;

input means for user selection of a said Gold or Kasami code; and

indicating means for indicating when a tag with the selected code is detected.

39. A detector as claimed in claim 38 further comprising input means for user input of tag identity data and wherein the or another indicating means indicates when a tag with both the selected code and the user-input tag identity is detected.

40. A detector as claimed in claim 39 further comprising means to indicate when a tag with the selected code and identity data different to the user-input tag identity is detected.

41. A detector as claimed in claim 38 wherein the DSSS receiver is configured to receive a spread spectrum signal unmodulated by baseband data and wherein a tag for detection is identified by said unmodulated Gold or Kasami code.

42. A detector as claimed in claim 38 further comprising a second aerial, the first and second aerials having different directionality, and means for selectively coupling either the first or the second aerial to the receiver.

43. A detector as claimed in claim 38 further comprising an acoustic transducer and means coupled to the acoustic transducer to indicate the issue of an acoustic command signal for commanding a tag.

44. A detector as claimed in claim 38 further comprising means to issue an acoustic command signal to a tag.

45. A detector as claimed in claim 38 further comprising means to issue an rf command signal to a tag.

46. A detector as claimed in claim 38 wherein the detector comprises control means for searching or indicating a search for the tagged object substantially only when a tag is likely to be transmitting.

47. A detector as claimed in claim 38 further comprising test transmission means for transmitting a test transmission for testing operation of the detector.

48. A tag for use with a tag detector radar, the tag comprising:

a pseudonoise (PN) code generator for generating a spreading code for a spread spectrum system; and

a modulator and antenna combination for providing a modulated radar return from the tag;

wherein the PN code generator is coupled to the modulator for modulating the radar return with the spreading code.

49. A tag as claimed in claim 48 wherein the modulator comprises means to phase modulate the spreading code onto the radar return.

50. A tag as claimed in claim 48 comprising mixing means to mix an incident radar signal with the PN code to modulate the spreading code onto the radar return.

51. A tag as claimed in claim 48 wherein the modulator comprises amplitude modulation means to amplitude modulate the spreading code onto the radar return.

52. A tag as claimed in claim 48 wherein the modulator comprises switch means coupled to the code generator and to the antenna to modulate the radar return with the spreading code.

53. A tag as claimed in claim 52 wherein the antenna approximates a dipole and wherein the switch means is coupled between arms of the dipole.

54. A tag as claimed in claim 48 wherein the code is selected from an m-sequence and/or a Gold code and/or a Kasami code.

55. A tag as claimed in claim 48 further comprising means to modulate the PN code with baseband data.

56. A tag as claimed in claim 48 further comprising a command receiver to control operation of the PN code generator and/or modulator.

57. A tag as claimed in claim 48 further comprising means to at least partially power the tag using incident radar radiation.

58. A set of tags each as claimed in claim 48, each having a spreading code with a high autocorrelation coefficient and a low cross-correlation coefficient with the codes of other tags in the set.

59. A radar detector for a tag providing a radar return modulated with a spread spectrum code, the detector comprising a radar front end coupled to a spread spectrum receiver.

60. A radar detector as claimed in claim 59 wherein the radar is a homodyne radar.

61. A radar detector as claimed in claim 59 wherein the receiver is adapted for reception of a phase modulated spread spectrum signal.

62. A radar detector as claimed in claim 59 wherein the receiver is adapted for reception of an amplitude modulated return signal

63. A network comprising a plurality of tag detectors, each as claimed in claim 59 coupled to a central control unit for providing an approximate tag location.

64. A system for alerting a user having a tag receiver to separation from a tagged object, the system comprising a tag and a tag receiver, the tag comprising:

an activation/deactivation control device; and

a transmitter coupled to the control device;

the tag being configured to:

upon activation, start transmitting; and

upon deactivation, transmit a deactivation signal and cease transmitting;

the tag receiver comprising:

a receiver for receiving transmissions from the tag;

a detector, coupled to the receiver, for detecting a reduction in the strength of signal received from the tag and for detecting reception of the deactivation signal from the tag; and

an alarm device, coupled to the detector, for providing a user alert when a reduction in signal strength is detected without a deactivation signal.

65. A system as claimed in claim 64 wherein the deactivation signal comprises at least one pulse.

66. A system as claimed in claim 64 wherein said detector detects a reduction to a threshold level in the strength of signal received from the tag.

67. A system as claimed in claim 64 wherein said detector detects a rate of reduction in the strength of signal received from the tag.

68. A system as claimed in claim 64 wherein the tag is a radio frequency tag providing an rf output modulated by a baseband signal comprising at least the deactivation signal, and wherein the half power bandwidth of the rf output is at least ten times the half power bandwidth of the baseband signal.

69. A system as claimed in claim 64 wherein the tag transmitter is a spread spectrum transmitter.

70. A system as claimed in claim 69 wherein the spread spectrum transmitter is a direct sequence spread spectrum transmitter.

71. A system as claimed in claim 69 wherein the spread spectrum transmitter is a frequency hopping spread spectrum transmitter.

72. A system as claimed in claim 71 wherein the frequency hopping spread spectrum transmitter operates substantially consistently with at least version 1.0 of the Bluetooth standard.

73. A system as claimed in claim 64 wherein the transmitter, when activated, transmits an rf signal modulated by a tone.

74. A system as claimed in claim 64 wherein the control device comprises an orientation-operated switch.

75. A system for alerting a user having a tag receiver to separation from a tagged object, the system comprising a tag and a tag receiver,
the tag comprising:
a spread spectrum transmitter; and
a switch coupled to the spread spectrum transmitter for switching the spread spectrum transmitter on and off;
the tag receiver comprising:
a receiver for receiving transmissions from the tag;
a detector, coupled to the receiver, for detecting a reduction in the strength of signal received from the tag; and
an alarm device, coupled to the detector, for providing a user alert when a reduction in signal strength is detected.

76. A system as claimed in claim 75 wherein the spread spectrum transmitter is a direct sequence spread spectrum transmitter.

77. A system as claimed in claim 76 wherein the receiver has a first receiving antenna and one or more additional features selected from (i) an adjustable range; (ii) a received signal strength indicator; and (iii) a second, directional receiving antenna and means for selecting one of said first and second receiving antennas